AREI UPDATES: Nutrient Use and Management

Updates on Agricultural Resources and Environmental Indicators

Natural Resources and Environmental Division
Economic Research Service, U.S. Department of Agriculture

1995
Number 2

1994 Nutrient Use and Practices on Major Field Crops

- **Total nutrient use was 7 percent higher in 1994 than in 1993 with nitrogen use up 11 percent and phosphate and potash use up about 2 percent each. The major factor was increased corn acreage, which uses 40 to 45 percent of all fertilizer.**
- **Nitrogen use per acre averaged higher on corn, cotton, soybeans, and wheat, but lower on fall potatoes.**
- **Spring before planting is the most common time to apply fertilizer to corn and soybeans; after planting for upland cotton, durum and spring wheat, and fall potatoes; and fall before planting for winter wheat.**

Both total fertilizer use data from the Tennessee Valley Authority and USDA Cropping Practices Survey indicate increased fertilizer use in 1994 over year-earlier levels. The USDA survey covers the 10 major corn, 8 soybean, 6 upland cotton, 4 spring wheat, 13 winter wheat, and 11 fall potato States. (For 1993 data, see RTD UPDATES: Fertilizer, March 1994, Number 1; and Agricultural Resources and Environmental Indicators, AH-705, Econ. Res. Serv., U.S. Dept. Agriculture, Dec. 1994, pp. 65-85.)

Fertilizer use in 1994 on corn, the largest fertilizer-using crop, was as follows: Nitrogen—97 percent of planted acres fertilized (same as 1993), averaging 129 pounds per acre, up 6 pounds from 1993; Phosphate—83 percent of planted acres fertilized (up 1 percent), averaging 57 pounds per acre, up 1 pound from 1993; Potash—72 percent of acres fertilized (71 percent in 1993), averaging 80 pounds per acre, up 1 pound.

Fertilizer use on 1994 wheat, the second most fertilizer-using crop, was as follows: Nitrogen—87 percent of acres fertilized (up 1 percent over 1993), averaging 67 pounds per acre, up 3 pounds from 1993; Phosphate—59 percent of acres fertilized (60 percent in 1993), averaging 35 pounds per acre, up 1 pound from 1993; Potash—17 percent of acres fertilized (same as 1993), averaging 38 pounds per acre, up 3 pounds. Of the acres tested for N, 84 percent followed recommended rates.

Livestock manure was applied on 16 percent of corn and on 8 percent of soybean acres in the major growing states.

Ground broadcast continued to be the principal method of fertilizer application on the major crops, followed by banding and injection. Chemigation was used on about 45 percent of the potato area.

Acreage soil tested for fertilizer needs in the major growing States ranged down from 85 percent of that in potatoes to 23 percent of that in wheat. Tissue testing for nutrient needs occurred primarily with potatoes (61 percent of acreage) and cotton (11 percent).

Micro-nutrients and sulfur were applied to nearly 60 percent of the potato acreage in the major growing States.

Contact Harold Taylor (202) 219-0476.

About AREI UPDATES

AREI UPDATES (formerly RTD UPDATES) is a periodic series which supplements and updates information in the annual report **Agricultural Resources and Environmental Indicators (AREI).** These **UPDATES** report recent data from surveys of farm operators and others knowledgeable about changing agricultural resource use and conditions, with only minimal interpretation or analysis. Please contact the individual listed at the end of the text for additional information about the data in this **UPDATE**. If you would like to be added to the mailing list or have other questions about **AREI UPDATES** or the annual **AREI** report, contact Richard Magleby, (202) 219-0436.

U.S. Fertilizer Use 1964-94

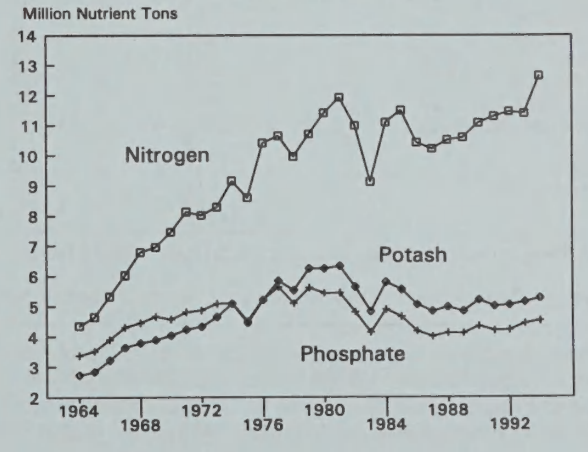

Table 1--Commercial nutrient use by State for years ending June 30, 1993-1994 1/

State/ region	1993			1994		
	Nitrogen	Phosphate	Potash	Nitrogen	Phosphate	Potash
	1,000 nutrient tons					
Maine	12	8	7	12	11	10
New Hampshire	3	1	2	3	1	2
Vermont	5	4	5	6	4	6
Massachusetts	13	6	9	14	7	9
Rhode Island	5	1	1	2	1	1
Connecticut	7	3	4	7	3	4
New York	93	62	83	116	77	104
New Jersey	32	16	22	33	21	25
Pennsylvania	96	73	68	103	66	76
Delaware	20	7	15	20	7	14
Maryland	63	30	45	60	35	48
NORTHEAST	350	211	262	376	232	299
Michigan	240	109	218	280	116	235
Wisconsin	203	107	248	216	113	263
Minnesota	629	259	313	691	236	282
LAKE STATES	1,073	474	779	1,186	465	781
Ohio	426	209	391	498	244	426
Indiana	457	209	342	582	213	390
Illinois	866	377	597	1,027	393	636
Iowa	840	336	452	1,036	294	442
Missouri	414	181	252	419	173	238
CORN BELT	3,003	1,312	2,034	3,562	1,317	2,133
North Dakota	497	190	32	528	194	31
South Dakota	205	92	21	208	98	16
Nebraska	729	184	38	900	184	36
Kansas	659	180	42	683	173	40
NORTHERN PLAINS	2,090	646	134	2,319	649	123
Virginia	108	76	103	101	67	93
West Virginia	10	10	10	9	10	9
North Carolina	219	107	192	228	114	197
Kentucky	208	115	142	214	119	146
Tennessee	161	101	128	167	103	131
APPALACHIA	705	410	575	720	412	576
South Carolina	80	36	70	87	39	75
Georgia 2/	214	126	177	228	122	171
Florida	253	98	258	236	95	227
Alabama	136	55	76	150	41	63
SOUTHEAST	682	314	581	701	297	535
Mississippi	187	54	108	172	64	104
Arkansas	267	73	109	303	79	120
Louisiana	161	45	71	188	50	78
DELTA STATES	615	172	288	663	192	302
Oklahoma	301	92	34	337	91	32
Texas	934	248	133	1,040	273	159
SOUTHERN PLAINS	1,235	340	168	1,377	363	191
Montana	132	74	16	129	65	14
Idaho	213	93	20	202	84	22
Wyoming	86	23	2	103	27	2
Colorado	174	50	19	176	55	17
New Mexico	36	16	6	42	18	6
Arizona	73	25	1	90	30	1
Utah	28	12	16	27	15	4
Nevada	3	3	1	6	3	1
MOUNTAIN	744	296	80	775	298	68
Washington	193	53	38	225	61	45
Oregon	132	41	28	157	45	31
California	540	156	150	549	179	162
PACIFIC	865	250	216	932	285	238
48 States and D.C.	11,361	4,424	5,118	12,613	4,511	5,246
Alaska	3	1	0	3	0	0
Hawaii	17	6	13	18	6	14
Puerto Rico	11	4	10	9	3	8
U.S. TOTAL	11,392	4,435	5,141	12,643	4,521	5,268

1/ Totals may not add due to rounding. 2/ Data are estimated.

Source: Tennessee Valley Authority, Environmental Research Center. Commercial Fertilizers 1994.

Table 2--Nutrient use and practices on corn for grain, major producing States, 1994

Practice	IL	IN	IA	MI	MN	MO	NE	NE(N)	NE(I)	OH	SD	WI	AREA
	Thousand acres												
Planted acres	11,600	6,100	13,000	2,550	7,000	2,400	8,600	3,285	5,315	3,700	3,800	3.750	62,500
	Percent of planted acres 1/												
Livestock manure applied	9	9	21	18	26	3	5	7	4	14	15	48	16
Commercial fertilizers ap.	99	97	98	98	96	100	97	94	99	100	92	96	97
Nitrogen	98	97	98	98	96	100	97	94	99	99	92	96	97
Phosphate	86	92	75	89	87	85	72	58	80	95	76	91	83
Potash	87	82	74	88	83	82	24	22	26	91	32	91	72
Both chemical and manure ap.	9	9	21	16	24	3	4	6	4	14	11	45	15
Lime applied	9	7	4	9	1	3	2	1	2	9	1	5	5
Sulphur applied	5	7	6	9	7	8	33	18	42	9	4	15	10
Micro nutrients applied	6	13	4	23	9	6	25	17	31	14	5	14	11
Nitrogen inhibitor used	19	18	5	9	5	5	5	2	7	15	2	6	10
Soil tested	34	46	44	47	45	20	53	31	67	40	35	30	41
Tested for N 2/	31	40	48	54	37	75	95	98	94	39	97	43	54
Applied recommended N 3/	81	84	79	93	91	79	88	80	90	85	72	78	84
Applied > recommended 3/	18	6	8	4	2	5	5	4	5	2	6	15	7
Applied < recommended 3/	1	10	13	3	6	9	7	16	4	13	22	7	10
Fertilizer timing:	Percent of treated acres												
Fall before planting	45	42	31	23	35	32	24	21	26	34	36	22	34
Spring before planting	71	54	76	46	49	62	51	53	50	48	43	27	58
At planting	15	73	21	87	47	14	59	43	68	80	32	90	44
After planting	21	46	14	50	18	23	34	25	39	53	21	24	27
Nitrogen timing:													
Fall before planting	37	26	27	7	35	29	23	20	25	13	36	18	27
Spring before planting	67	43	74	25	46	59	51	53	50	41	43	25	54
At planting	14	69	20	86	45	14	58	43	67	79	32	90	43
After planting	21	46	14	51	17	23	34	25	38	53	21	24	27
Phosphate timing:													
Fall before planting	40	27	30	3	26	32	7	12	5	21	29	4	25
Spring before planting	48	29	50	8	30	56	20	24	18	18	36	5	34
At planting	14	72	25	90	49	11	75	62	80	81	36	92	48
After planting	1	2	2	1	1	2	3	8	1	3	3	2	2
Potash timing:													
Fall before planting	42	43	32	24	30	34	11	18	8	34	30	11	33
Spring before planting	50	45	50	36	36	59	20	27	17	28	56	7	41
At planting	9	24	21	65	40	6	71	50	81	55	13	88	33
After planting	1	2	2	2	1	3	3	5	2	3	4	2	2
Fertilizer appl. method:													
Broadcast (ground)	89	86	74	69	68	88	40	52	34	77	77	43	72
Broadcast (air)	2	2	1	2	1	NR	@	NR	1	1	NR	1	1
Chemigation	1	@	NR	1	NR	@	3	NR	1	NR	1	NR	1
Banded	12	62	20	88	48	11	56	40	65	77	32	90	41
Foliar	@	1	@	1	@	NR	NR	NR	NR	2	NR	NR	@
Injected (knifed in)	62	64	58	44	47	37	70	50	81	48	18	26	53
Average treatments per	Number												
treated acre	1.9	2.4	1.6	2.2	1.7	1.4	1.9	1.5	2.1	2.4	1.4	1.6	1.8
Acres surveyed	732	475	804	304	477	295	551	188	363	384	260	364	4,646
Average application rates	Pounds per treated acre												
Nitrogen:													
Annual	153	147	121	116	108	142	139	100	162	150	90	82	129
Fall before planting	96	81	84	84	103	106	126	85	145	65	89	97	96
Spring before planting	129	117	112	114	108	125	128	103	144	124	83	105	118
At planting	39	35	18	32	19	41	23	25	23	30	24	22	27
After planting	120	116	89	108	86	139	93	71	102	125	70	77	105
Phosphate:													
Annual	75	74	58	49	51	56	32	31	33	70	39	43	57
Fall before planting	81	64	66	42	59	58	41	32	50	58	45	51	66
Spring before planting	76	69	59	53	57	58	39	36	40	73	40	41	62
At planting	39	50	30	48	35	40	27	25	29	55	31	42	40
After planting	79	66	52	18	37	46	30	29	34	53	33	38	48
Potash:													
Annual	103	112	71	90	65	70	15	15	15	100	28	60	80
Fall before planting	114	117	89	107	73	78	29	19	39	118	31	83	98
Spring before planting	101	115	70	105	74	69	22	19	24	111	27	87	85
At planting	36	39	30	39	40	34	10	11	9	45	22	50	38
After planting	111	38	56	40	92	53	9	10	8	120	20	47	66
Sulphur	16	12	9	11	11	11	11	8	13	18	10	8	12
	Tons per treated acre												
Lime	1.8	1.9	1.5	1.3	2.2	2.6	0.5	2.0	0.1	1.7	0.1	2.0	1.7

@ = less than 0.5 percent. Seasonal information will be less reliable than annual. NR = None reported. (N) = Non irrigated. (I) = Irrigated.

1/ Percents in any column for a practice may add to over 100 since an acre can be treated more than once.
2/ Percent of soil tested acres tested for nitrogen. 3/ Percent of nitrogen tested acres.
Source: Cropping Practices Survey, USDA.

Table 3--Nutrient use and practices on soybeans, major producing States, 1994

Practice	AR	IL	IN	IA	MN	MO	NE	OH	AREA
					-Thousand acres-				
Planted acres	3,450	9,600	4,700	8,800	5,700	4,600	2,900	4,000	43,750
					Percent of planted acres 1/				
Livestock manure applied	1	6	9	14	11	1	6	7	8
Commercial fertilizers appl.	36	32	39	14	15	23	27	47	27
Nitrogen	15	10	17	7	12	11	24	19	13
Phosphate	31	20	28	12	13	18	25	31	20
Potash	32	31	38	12	14	23	12	47	25
Both chemical and manure ap.	@	1	3	2	1	@	NR	4	2
Lime applied	4	8	5	3	@	3	2	7	4
Sulphur applied	1	3	1	2	@	4	7	2	2
Micro nutrients applied	2	3	4	@	@	2	8	3	2
Nitrogen inhibitor used	4	1	1	NR	NR	7	4	1	2
Soil tested	30	27	36	37	35	13	27	32	30
Tested for N 2/	67	21	35	48	34	74	89	33	43
Applied recommended N 3/	91	57	70	79	70	77	82	73	76
Applied > recommended 3/	2	10	2	6	NR	3	5	12	5
Applied < recommended 3/	8	33	18	14	30	20	11	15	18
Fertilizer timing:					Percent of treated acres				
Fall before planting	56	40	54	42	32	45	29	47	44
Spring before planting	44	53	32	40	37	38	41	46	43
At planting	1	8	19	13	29	13	30	12	13
After planting	2	2	4	5	6	7	9	5	4
Nitrogen timing:									
Fall before planting	52	31	33	24	35	18	32	27	31
Spring before planting	50	53	21	45	31	54	34	50	42
At planting	NR	16	38	21	37	15	32	22	24
After planting	4	2	10	9	4	12	10	7	7
Phosphate timing:									
Fall before planting	54	40	49	44	38	40	27	36	42
Spring before planting	45	48	24	38	30	40	41	48	40
At planting	1	13	25	13	34	12	31	13	17
After planting	2	NR	3	4	NR	8	3	4	3
Potash timing:									
Fall before planting	51	41	54	45	34	46	26	48	45
Spring before planting	48	52	32	40	36	39	32	42	43
At planting	1	5	16	15	28	12	42	8	12
After planting	2	1	2	NR	3	6	3	3	2
Fertilizer appl. method:									
Broadcast (ground)	91	96	83	87	72	93	65	94	88
Broadcast (air)	9	NR	4	NR	NR	1	NR	NR	2
Chemigation	NR	NR	NR	NR	3	NR	NR	NR	@
Banded	NR	5	18	11	23	10	30	10	11
Foliar	NR	NR	NR	NR	NR	NR	NR	NR	NR
Injected (knifed in)	NR	1	1	NR	6	NR	14	1	2
Average treatments per					Number				
treated acre	1.0	1.1	1.1	1.1	1.1	1.0	1.1	1.1	1.1
Acres surveyed	329	528	357	451	426	358	256	318	3,020
Average application rates					Pounds per treated acre 4/				
Nitrogen:									
Annual	34*	33#	19#	27#	19#	31#	21*	18*	25
Fall before planting	40	23	17	25	21	29	37	23	27
Spring before planting	26	43	24	43	28	34	17	13	30
At planting	NR	14	16	8	7	7	8	20	12
After planting	7	45	25	1	3	52	8	14	20
Phosphate:									
Annual	49*	62	37	43	39*	44	36	48	47
Fall before planting	51	72	42	50	56	50	46	46	53
Spring before planting	49	59	37	45	32	42	40	48	47
At planting	45	34	29	23	26	29	19	55	30
After planting	24	NR	38	1	NR	41	36	27	29
Potash:									
Annual	64	97	85	56	66*	70	21*	103	81
Fall before planting	67	109	92	72	84	89	24	121	95
Spring before planting	60	94	85	47	58	51	36	89	76
At planting	90	58	35	35	42	40	8	70	41
After planting	16	52	78	NR	135	70	7	74	69
Sulphur	100	11	200	4	25	8	6	17	16
					Tons per treated acre				
Lime	1.3	2.1	1.6	1.7	2.0	1.7	0.6	1.3	1.7

@ = less than 0.5 percent. NR = None reported.

1/ Percents in any column for a practice may add to over 100 since an acre can be treated more than once. 2/ Percent of soil tested acres tested for nitrogen. 3/ Percent of nitrogen tested acres. 4/ In general, annual estimates are more reliable than seasonal estimates. Annual estimates that may be less reliable due to data variation are indicated by * (CV > 10 percent) or # (CV > 20 percent).
Source: Cropping Practices Survey, USDA.

Table 4--Nutrient use and practices on upland cotton, durum wheat, and spring wheat, major producing States, 1994

Practice	Cotton							Durum	Spring				
	AZ	AR	CA	LA	MS	TX	AREA	ND	MN	MT	ND	SD	AREA
	Thousand acres												
Planted acres	313	980	1,100	900	1,280	5,450	10,023	2,450	2,600	3,450	9,100	2,100	17,250
	Percent of planted acres 1/												
Livestock manure applied	3	NR	21	NR	1	1	3	5	7	2	4	5	4
Commercial fertilizers appl.	97	95	96	92	100	79	87	83	98	77	92	79	88
Nitrogen	97	93	96	92	100	79	86	83	98	77	91	79	88
Phosphate	43	70	35	40	45	60	54	69	90	63	81	66	77
Potash	22	81	24	40	66	25	37	4	60	17	17	10	23
Both chemical and manure ap.	3	NR	18	NR	1	1	3	4	5	1	4	5	4
Lime applied	NR	7	1	16	12	NR	4	NR	NR	NR	NR	NR	NR
Sulphur applied	3	13	3	20	32	23	20	NR	3	9	2	NR	3
Micro nutrients applied	19	37	39	22	21	13	20	NR	2	NR	NR	NR	@
Nitrogen inhibitor used	14	2	3	18	2	3	4	1	5	NR	2	NR	2
Soil tested	28	51	40	59	47	20	33	22	42	21	29	24	29
Tested for N 2/	95	71	99	90	81	94	88	100	92	100	97	100	97
Applied recommended N 3/	78	85	92	96	82	68	81	89	92	71	100	79	92
Applied > recommended 3/	17	15	4	4	18	6	9	4	4	12	NR	NR	3
Applied < recommended 3/	5	NR	4	NR	NR	26	10	7	4	18	NR	21	6
Fertilizer timing:	Percent of treated acres												
Fall before planting	17	37	45	13	21	42	35	34	43	26	35	20	33
Spring before planting	22	55	21	56	58	48	47	55	52	18	59	48	49
At planting	15	10	14	10	8	5	8	78	67	73	59	43	61
After planting	95	59	86	63	72	32	52	1	7	7	3	NR	4
Nitrogen timing:													
Fall before planting	15	23	44	10	9	41	31	33	41	26	35	20	33
Spring before planting	22	52	21	45	54	47	45	55	52	18	58	48	49
At planting	15	9	13	10	8	5	7	77	67	73	57	41	60
After planting	95	60	86	63	72	32	53	1	7	6	3	NR	4
Phosphate timing:													
Fall before planting	34	39	69	23	12	43	40	1	9	11	8	11	9
Spring before planting	10	53	11	63	76	48	49	8	18	8	29	39	25
At planting	14	8	8	NR	7	2	4	91	73	78	63	50	66
After planting	59	5	25	14	8	9	11	NR	NR	4	1	NR	1
Potash timing:													
Fall before planting	7	39	44	20	20	52	37	NR	14	7	6	NR	9
Spring before planting	NR	54	11	66	68	39	49	20	24	7	33	67	28
At planting	20	7	13	NR	2	2	4	80	62	79	56	33	60
After planting	73	5	47	14	13	9	13	NR	NR	7	6	NR	3
Fertilizer appl. method:													
Broadcast (ground)	17	90	32	46	64	64	60	15	57	19	40	57	41
Broadcast (air)	8	10	5	18	12	1	6	NR	2	3	2	4	2
Chemigation	43	1	32	NR	NR	5	8	NR	3	NR	2	NR	2
Banded	22	10	25	29	19	19	20	76	56	69	61	33	58
Foliar	2	1	4	NR	2	NR	1	NR	NR	NR	NR	NR	NR
Injected (knifed in)	62	29	64	56	72	35	46	77	44	27	53	15	43
Average treatments per	Number												
treated acre	2.8	2.3	1.9	2.3	2.0	1.4	1.8	1.6	1.8	1.2	1.6	1.1	1.5
Acres surveyed	67	133	184	87	165	480	1,116	124	62	81	106	58	307
Average application rates	Pounds per treated acre 4/												
Nitrogen:													
Annual	220*	110	188	157*	122	71	110	70	94	39	76	52	70
Fall before planting	32	51	77	134	87	47	57	71	90	49	77	62	75
Spring before planting	55	61	119	108	70	57	68	67	75	54	64	65	66
At planting	307	85	130	81	54	43	93	13	20	21	16	22	18
After planting	164	98	130	140	100	70	105	5	68	27	58	NR	52
Phosphate:													
Annual	51*	44	60	45*	54	38	43	26	38	22	38*	23	34
Fall before planting	55	44	56	59	67	36	42	20	48	24	55	27	44
Spring before planting	48	42	84	41	55	41	44	26	39	24	41	26	38
At planting	69	32	2	NR	28	34	31	26	36	21	34	20	30
After planting	31	38	50	37	29	20	29	NR	NR	27	43	NR	35
Potash:													
Annual	10#	73	39*	59	101	20	55	9	27*	9#	20#	14*	21*
Fall before planting	30	70	34	55	125	20	47	NR	28	10	16	NR	23
Spring before planting	NR	73	56	66	93	23	63	10	36	30	42	17	36
At planting	12	49	1	NR	19	11	25	9	24	7	8	9	15
After planting	8	59	38	30	87	9	39	NR	NR	10	10	NR	10
Sulphur	26	11	82	11	10	13	13	NR	3	6	8	NR	6
	Tons per treated acre												
Lime	NR	2.1	NR	0.7	1.1	NR	1.1	NR	NR	NR	NR	NR	NR

@ = less than 0.5 percent. NR = None reported.

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2/ Percent of soil tested acres tested for nitrogen. 3/ Percent of nitrogen tested acres. 4/ In general, annual estimates are more reliable than seasonal estimates. Annual estimates that may be less reliable due to data variation are indicated by * (CV > 10 percent) or # (CV > 20 percent).
Source: Cropping Practices Survey, USDA.

Table 5--Nutrient use and practices on fall potatoes, major producing States, 1994

Practice	CO	ID	ME	MI	MN	NY	ND	OR	PA	WA	WI	AREA
	Thousand acres											
Planted acres	74	410	78	44	74	29	133	53.5	19	152	73	1,139.6
	Percent of planted acres 1/											
Livestock manure applied	5	3	3	2	1	2	NR	1	17	NR	2	2
Commercial fertilizers appl.	95	100	100	100	100	95	100	100	100	100	100	100
Nitrogen	95	100	100	100	100	95	100	100	100	100	100	100
Phosphate	95	99	99	96	99	94	95	95	100	96	100	98
Potash	90	87	99	100	99	94	85	76	100	94	100	91
Both chemical and manure ap.	5	3	3	2	1	1	NR	1	17	NR	2	2
Lime applied	8	1	38	7	NR	9	NR	9	24	3	19	6
Sulphur applied	83	77	3	28	16	11	25	68	27	92	57	58
Micro nutrients applied	40	80	21	61	16	39	24	51	52	77	80	59
Nitrogen inhibitor used	NR	6	2	2	4	NR	5	5	12	6	3	5
Soil tested	90	91	59	86	85	47	76	77	73	99	93	85
Tested for N 2/	100	99	62	63	85	43	100	96	67	100	73	92
Applied recommended N 3/	83	66	87	67	87	94	80	85	100	90	70	76
Applied > recommended 3/	6	8	6	33	12	6	20	8	NR	2	24	10
Applied < recommended 3/	11	26	NR	NR	1	NR	NR	7	NR	8	5	14
Fertilizer timing:	Percent of treated acres											
Fall before planting	13	46	1	33	8	19	15	39	4	64	43	35
Spring before planting	53	61	3	59	46	8	61	53	25	36	42	48
At planting	53	16	97	82	59	87	39	46	100	20	93	42
After planting	63	86	19	92	6	35	29	81	47	64	94	64
Nitrogen timing:												
Fall before planting	5	45	1	18	8	10	15	39	1	63	3	30
Spring before planting	45	59	3	19	40	5	61	53	19	36	10	43
At planting	50	14	97	82	59	83	39	46	100	20	92	41
After planting	58	86	18	92	5	34	29	79	47	64	94	63
Phosphate timing:												
Fall before planting	5	45	1	NR	5	10	5	36	NR	61	2	28
Spring before planting	50	54	3	2	36	5	59	41	4	33	8	39
At planting	50	14	97	84	59	83	41	40	100	20	91	41
After planting	18	45	4	20	2	5	6	24	11	48	20	28
Potash timing:												
Fall before planting	8	38	1	33	5	19	3	35	3	62	43	30
Spring before planting	44	49	3	59	46	8	56	43	23	32	42	42
At planting	42	7	97	45	58	83	45	26	95	14	91	36
After planting	19	43	6	34	3	6	16	29	21	34	29	28
Fertilizer appl. method:												
Broadcast (ground)	37	92	17	95	39	47	75	89	41	90	91	76
Broadcast (air)	NR	14	NR	14	1	NR	6	4	NR	14	7	9
Chemigation	55	70	NR	15	3	NR	10	67	NR	66	38	45
Banded	76	32	97	94	72	84	39	50	99	19	100	51
Foliar	3	2	6	2	NR	NR	NR	NR	17	NR	4	2
Injected (knifed in)	5	6	NR	14	3	NR	12	11	5	5	5	6
Average treatments per	Number											
treated acre	5.8	3.6	1.2	3.9	1.3	1.5	1.9	2.0	2.1	1.6	3.9	2.8
Acres surveyed	40	270	143	85	70	124	105	122	75	157	138	1,329
Average application rates	Pounds per treated acre 4/											
Nitrogen:												
Annual	610*	261	176	252*	68	148	129	455*	163	353	234	264
Fall before planting	406	97	126	348	89	108	79	94	300	165	42	124
Spring before planting	244	116	107	36	72	126	84	91	67	172	62	118
At planting	759	49	163	56	44	132	86	167	119	64	52	140
After planting	173	167	75	150	148	61	112	373	59	274	189	188
Phosphate:												
Annual	488#	192	176	110	68	216	78	178	121	280	143	192
Fall before planting	206	156	161	NR	88	90	49	126	NR	192	54	161
Spring before planting	200	126	119	132	82	127	77	134	56	186	126	128
At planting	710	75	174	109	55	234	66	110	118	112	138	163
After planting	120	95	29	75	62	103	59	135	5	163	30	107
Potash:												
Annual	303#	126	179	290*	95*	187	100	195*	165	271	340	184
Fall before planting	87	110	161	316	185	186	23	117	300	254	251	178
Spring before planting	81	90	107	200	118	178	80	152	157	182	262	123
At planting	596	35	176	87	50	158	87	144	128	128	118	150
After planting	60	87	56	85	106	145	91	180	3	107	45	89
Sulphur	73	96	25	41	38	111	29	49	22	94	50	82
	Tons per treated acre											
Lime	0.1	1.0	0.9	0.1	NR	1.1	NR	0.6	1.4	0.8	1.2	0.9

NR = None reported.

1/ Percents in any column for a practice may add to exceed 100 since an acre can be treated more than once. 2/ Percent of soil tested acres tested for nitrogen. 3/ Percent of nitrogen tested acres. 4/ In general, annual estimates are more reliable than seasonal estimates. Annual estimates that may be less reliable due to data variation are indicated by * (CV > 10 percent) or # (CV > 20 percent).
Source: Cropping Practices Survey, USDA.

Table 6--Nutrient use and practices on winter wheat, major producing States, 1994

Practice	CO	ID	IL	KS	MO	MT	NE	OH	OK	OR	SD	TX	WA	AREA
	Thousand acres													
Harvested acres	2,550	790	900	11,400	1,100	1,850	2,100	1,800	5,300	870	1,350	2,900	2,300	34,590
	Percent of harvested acres 1/													
Livestock manure applied	5	3	4	2	5	2	6	5	1	4	2	3	2	3
Commercial fertilizers ap.	67	91	97	89	98	83	81	99	95	99	53	71	99	86
Nitrogen	67	91	97	89	98	83	81	99	95	99	53	70	99	86
Phosphate	24	57	86	49	77	79	47	91	59	11	31	34	29	49
Potash	5	7	79	6	81	17	8	96	10	6	6	8	4	15
Both chemical and manure ap.	2	2	3	2	5	2	3	4	1	4	0	1	2	2
Lime applied	NR	NR	9	1	3	NR	NR	5	2	NR	NR	1	NR	1
Sulphur applied	9	52	5	4	14	9	11	22	5	40	9	9	75	14
Micro nutrients applied	2	8	NR	2	2	1	13	3	3	3	2	1	7	3
Nitrogen inhibitor used	NR	3	4	2	NR	1	NR	6	3	NR	2	3	2	2
Soil tested	15	41	13	12	16	22	17	25	29	46	7	7	49	20
Tested for N 2/	100	92	30	94	50	97	100	52	95	98	100	63	97	91
Applied recommended N 3/	80	70	100	90	80	67	67	90	78	66	71	88	74	78
Applied > recommended 3/	10	6	NR	3	NR	6	NR	NR	5	10	29	12	16	7
Applied < recommended 3/	10	24	NR	6	20	28	33	10	17	24	NR	NR	10	15
Fertilizer timing:	Percent of treated acres													
Fall before planting	80	78	89	78	71	53	74	78	82	82	9	75	89	76
Spring before planting	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
At planting	13	16	3	26	11	81	23	18	25	9	51	16	20	25
After planting	19	55	82	42	78	28	29	90	42	26	71	45	11	42
Nitrogen timing:														
Fall before planting	80	78	83	78	69	53	72	73	82	82	9	74	89	76
Spring before planting	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
At planting	13	16	1	24	7	72	23	16	25	9	51	15	13	23
After planting	19	55	82	42	78	26	29	90	41	26	71	45	11	42
Phosphate timing:														
Fall before planting	53	76	94	53	80	15	65	79	63	29	NR	68	49	57
Spring before planting	NR	NR	NR	1	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
At planting	32	18	2	42	10	84	32	17	36	61	82	26	53	38
After planting	15	16	5	5	11	6	4	11	6	19	24	6	6	7
Potash timing:														
Fall before planting	29	50	97	56	79	21	46	79	80	NR	NR	78	57	70
Spring before planting	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
At planting	NR	NR	2	12	11	73	15	19	20	60	100	NR	14	18
After planting	71	50	3	31	10	14	55	12	NR	80	NR	22	29	16
Fertilizer appl. method:														
Broadcast (ground)	51	69	99	59	97	38	48	98	64	30	77	60	16	58
Broadcast (air)	NR	10	7	NR	7	1	2	5	3	4	10	5	4	3
Chemigation	NR	2	3	NR	NR	NR	NR	NR	NR	4	NR	3	2	1
Banded	4	6	NR	18	NR	79	24	8	21	4	44	8	14	19
Foliar	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Injected (knifed in)	59	43	3	50	NR	43	45	NR	52	70	NR	42	84	46
Average treatments per	Number													
treated acre	1.1	1.5	1.9	1.5	1.7	1.6	1.3	2.0	1.7	1.2	1.1	1.6	1.2	1.5
Acres surveyed	64	88	71	251	65	88	93	69	149	90	57	177	153	1,415
Average application rates	Pounds per treated acre 4/													
Nitrogen:														
Annual	42	96	105	59	86	59	43	82	69	63	51*	89	71	66
Fall before planting	42	76	47	48	42	62	43	30	61	45	58	75	65	53
Spring before planting	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
At planting	27	39	100	16	50	11	8	14	16	19	24	32	45	19
After planting	25	56	79	41	69	70	37	64	35	96	48	62	66	50
Phosphate:														
Annual	21#	35	80	32	46	30	30	65	36	32*	22*	41	23*	37
Fall before planting	24	31	79	36	46	28	31	65	39	41	NR	39	26	42
Spring before planting	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
At planting	25	36	110	28	53	30	27	48	28	24	25	48	15	29
After planting	5	34	96	17	38	23	34	44	29	30	7	34	35	27
Potash:														
Annual	6#	40#	95	34#	60	11#	4*	76	36#	38#	22#	19#	19#	53
Fall before planting	10	57	95	44	61	15	4	73	41	NR	NR	20	24	61
Spring before planting	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
At planting	NR	NR	110	58	63	9	4	68	13	24	22	NR	3	37
After planting	4	24	51	6	48	8	3	46	NR	29	NR	14	16	21
Sulphur	10	25	57	6	12	8	8	5	9	14	5	11	12	12
	Tons per treated acre													
Lime	NR	NR	2.8	1.7	1.6	NR	NR	1.1	1.5	NR	NR	0.5	NR	1.7

NR = None reported.

1/ Percents in any column for a practice may add to exceed 100 since an acre can be treated more than once. 2/ Percent of soil tested acres tested for nitrogen. 3/ Percent of nitrogen tested acres. 4/ In general, annual estimates are more reliable than seasonal estimates. Annual estimates that may be less reliable due to data variation are indicated by * (CV > 10 percent) or # (CV > 20 percent).
Source: Cropping Practices Survey, USDA.

Table 7--Nutrient use and practices on all wheat, major producing States, 1994

Practice	CO	ID	IL	KS	MN	MO	MT	NE	ND	OH	OK	OR	SD	TX	WA	AREA
	Million acres															
Acres	2.6	0.8	0.9	11.4	2.6	1.1	5.3	2.1	11.6	1.2	5.3	0.9	3.5	2.9	2.3	54.3
	Percent of harvested or planted acres 1/															
Livestock manure applied	5	3	4	2	7	5	2	6	4	5	1	4	4	3	2	3
Commercial fertilizers ap.	67	91	97	89	98	98	79	81	90	99	95	99	69	71	99	87
Nitrogen	67	91	97	89	98	98	79	81	89	99	95	99	69	70	99	87
Phosphate	24	57	86	49	90	77	68	47	78	91	59	11	51	34	29	59
Potash	5	7	79	6	60	81	17	8	14	96	10	5	9	8	4	17
Both chemical and manure ap.	2	2	3	2	5	5	2	3	4	4	1	4	3	1	2	2
Lime applied	NR	NR	9	1	NR	3	NR	NR	NR	5	2	NR	NR	1	NR	1
Sulphur applied	9	52	5	4	3	14	9	11	1	22	5	40	4	9	75	10
Micro nutrients applied	2	8	NR	2	2	2	1	13	NR	3	3	3	1	1	7	2
Nitrogen inhibitor used	NR	3	4	2	5	NR	1	NR	2	6	3	NR	1	3	2	2
Soil tested	15	41	13	12	42	16	21	17	28	25	29	46	17	7	49	23
Tested for N 2/	100	92	30	94	92	50	99	100	97	52	95	98	100	63	97	94
Applied recommended N 3/	80	70	100	90	92	80	69	67	98	90	78	66	77	88	74	84
Applied > recommended 3/	10	6	NR	3	4	NR	10	NR	1	NR	5	10	5	12	16	5
Applied < recommended 3/	10	24	NR	6	4	20	21	33	1	10	17	24	18	NR	10	11
Fertilizer timing:	Percent of treated acres															
Fall before planting	80	78	89	78	42	71	36	74	35	78	82	82	16	75	89	61
Spring before planting	NR	NR	NR	NR	52	NR	11	NR	58	NR	NR	NR	33	NR	NR	18
At planting	13	16	3	26	67	11	76	23	62	18	25	9	46	16	20	39
After planting	19	55	82	42	6	78	14	29	3	90	42	26	21	45	11	28
Nitrogen timing:																
Fall before planting	80	78	83	78	41	69	36	72	35	73	82	82	16	75	89	60
Spring before planting	NR	NR	NR	NR	52	NR	11	NR	58	NR	NR	NR	33	NR	NR	18
At planting	13	16	1	24	67	7	72	23	61	16	25	9	44	15	13	37
After planting	19	55	82	42	7	78	14	29	3	90	41	26	21	45	11	28
Phosphate timing:																
Fall before planting	53	76	94	53	9	80	13	65	7	79	63	29	8	68	49	34
Spring before planting	NR	NR	NR	NR	18	NR	5	NR	25	NR	NR	NR	30	NR	NR	11
At planting	32	18	2	42	73	10	80	32	68	17	36	61	57	26	53	53
After planting	15	16	5	5	NR	11	5	4	1	11	6	19	6	6	6	4
Potash timing:																
Fall before planting	29	50	97	56	14	79	12	46	5	79	80	NR	NR	78	57	43
Spring before planting	NR	NR	NR	NR	24	NR	5	NR	33	NR	NR	NR	49	NR	NR	12
At planting	NR	NR	2	12	62	11	77	15	57	19	20	60	51	NR	14	37
After planting	71	50	3	31	NR	10	9	55	5	12	NR	80	NR	22	29	10
Fertilizer appl. method:																
Broadcast (ground)	51	69	99	59	57	97	26	48	35	98	64	30	63	60	16	51
Broadcast (air)	NR	10	7	NR	2	7	3	2	2	5	3	4	6	5	4	2
Chemigation	NR	2	3	NR	3	NR	NR	NR	2	NR	NR	4	NR	3	2	1
Banded	4	6	NR	18	55	NR	73	24	64	8	21	4	36	8	14	34
Foliar	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Injected (knifed in)	59	43	3	50	44	NR	33	45	57	NR	52	70	10	42	84	46
Average treatments per	Number															
treated acre	1.1	1.5	1.9	1.5	1.8	1.7	1.3	1.3	1.6	2.0	1.7	1.2	1.1	1.6	1.2	1.5
Acres surveyed	64	88	71	251	62	65	169	93	230	69	149	90	115	177	153	1,846
Average application rates	Pounds per treated acre 4/															
Nitrogen:																
Annual	42	96	105	59	93	86	47	43	75	82	69	63	52	89	71	67
Fall before planting	42	76	47	48	90	42	56	43	76	30	61	45	61	75	65	57
Spring before planting	NR	NR	NR	NR	75	NR	54	NR	65	NR	NR	NR	65	NR	NR	66
At planting	27	39	100	16	20	50	17	8	15	14	16	19	23	32	45	18
After planting	25	56	79	41	68	69	57	37	55	64	35	96	48	62	66	50
Phosphate:																
Annual	21#	35	80	32	37	46	25	30	36	65	36	32*	23	41	23*	35
Fall before planting	24	31	79	36	48	46	26	31	53	65	39	41	27	39	26	42
Spring before planting	NR	NR	NR	NR	39	NR	24	NR	40	NR	NR	NR	26	NR	NR	37
At planting	25	36	110	28	36	53	24	27	31	48	28	24	22	48	15	30
After planting	5	34	96	17	NR	38	25	34	43	44	29	30	7	34	35	28
Potash:																
Annual	6#	40#	95	34#	27*	60	10*	4*	19#	76	36#	38#	17#	19#	19#	38
Fall before planting	10	57	95	44	28	61	13	4	16	73	41	NR	NR	20	24	58
Spring before planting	NR	NR	NR	NR	36	NR	30	NR	41	NR	NR	NR	17	NR	NR	35
At planting	NR	NR	110	58	24	63	8	4	9	68	13	24	16	NR	3	20
After planting	4	24	51	6	NR	48	9	3	10	46	NR	29	NR	14	16	19
Sulphur	10	25	57	6	3	12	7	8	8	5	9	14	5	11	12	12
	Tons per treated acre															
Lime	NR	NR	2.8	1.7	NR	1.6	NR	NR	NR	1.1	1.5	NR	NR	0.5	NR	1.7

NR = None reported.

1/ Percents in any column for a practice may add to exceed 100 since an acre can be treated more than once. Acres are harvested for winter wheat and planted for durum and spring wheat. 2/ Percent of soil tested acres tested for nitrogen. 3/ Percent of nitrogen tested acres. 4/ In general, annual estimates are more reliable than seasonal estimates. Annual estimates that may be less reliable due to data variation are indicated by * (CV > 10 percent) or # (CV > 20 percent).
Source: Cropping Practices Survey, USDA.

Table 8--Commercial fertilizer application rates by how applied, major crops and producing States, 1994

Crop														
Winter wheat	CO	ID	IL	KS	MO	MT	NE	OH	OK	OR	SD	TX	WA	AREA
	Pounds per treated acre													
Nitrogen:														
Broadcast (ground)	33	85	96	53	82	64	40	80	46	86	54	68	80	59
Broadcast (air)	NR	31	53	NR	108	69	21	74	23	51	30	65	41	49
Chemigation	NR	25	107	NR	NR	NR	NR	NR	NR	122	NR	64	77	81
Banded	8	33	NR	12	NR	15	11	11	22	22	16	54	46	18
Foliar	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Injected (knifed in)	43	75	122	52	NR	57	45	NR	66	42	NR	89	61	58
Phosphate:														
Broadcast (ground)	23	43	80	35	46	25	35	67	41	45	13	43	49	77
Broadcast (air)	NR	3	NR	NR	NR	NR	10	NR	22	NR	5	27	NR	15
Chemigation	NR	NR	127	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	127
Banded	26	33	NR	27	NR	30	27	41	28	23	26	47	12	28
Foliar	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Injected (knifed in)	12	20	NR	30	NR	26	20	NR	25	20	NR	36	16	24
Potash:														
Broadcast (ground)	6	40	96	33	60	13	4	78	45	29	NR	22	31	59
Broadcast (air)	NR	NR	60	NR	NR	NR	5	62	NR	NR	NR	NR	NR	44
Chemigation	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	9	NR	9
Banded	NR	NR	NR	40	NR	10	4	44	13	21	22	NR	NR	20
Foliar	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Injected (knifed in)	5	NR	NR	NR	NR	6	NR	NR	1	30	NR	20	10	9

Soybeans	AR	IL	IN	IA	MN	MO	NE	OH	AREA
	Pounds per treated acre								
Nitrogen:									
Broadcast (ground)	38	30	25	33	17	35	15	16	26
Broadcast (air)	20	NR	4	NR	NR	14	NR	NR	17
Chemigation	NR	NR	NR	NR	6	NR	NR	NR	6
Banded	NR	14	9	8	8	3	8	22	10
Foliar	NR	NR	NR	NR	NR	NR	NR	NR	NR
Injected (knifed in)	NR	131	NR	NR	63	NR	63	17	72
Phosphate:									
Broadcast (ground)	52	64	43	46	44	45	44	47	50
Broadcast (air)	20	NR	53	NR	NR	36	NR	NR	31
Chemigation	NR	NR	NR	NR	30	NR	NR	NR	30
Banded	NR	31	20	23	26	29	20	55	27
Foliar	NR	NR	NR	NR	NR	NR	NR	NR	NR
Injected (knifed in)	NR	NR	30	NR	23	NR	17	56	24
Potash:									
Broadcast (ground)	67	99	92	60	74	71	32	105	87
Broadcast (air)	27	NR	108	NR	NR	72	NR	NR	63
Chemigation	NR	NR	NR	NR	NR	NR	NR	NR	NR
Banded	NR	19	24	35	35	36	5	70	32
Foliar	NR	NR	NR	NR	NR	NR	NR	NR	NR
Injected (knifed in)	NR	NR	28	NR	65	NR	19	NR	37

Corn	IL	IN	IA	MI	MN	MO	NE	NE(N)	NE(I)	OH	SD	WI	AREA
	Pounds per treated acre												
Nitrogen:													
Broadcast (ground)	80	76	75	86	80	107	71	75	66	112	85	90	82
Broadcast (air)	99	58	65	116	85	NR	92	NR	92	74	NR	80	80
Chemigation	113	31	NR	42	NR	180	43	NR	43	NR	20	NR	52
Banded	26	31	20	35	19	39	28	23	30	30	28	23	40
Foliar	185	34	15	15	100	NR	NR	NR	NR	40	NR	NR	59
Injected (knifed in)	146	130	120	119	111	142	136	108	146	129	89	105	129
Phosphate:													
Broadcast (ground)	79	67	61	45	58	59	40	35	45	59	42	44	64
Broadcast (air)	88	53	51	NR	43	NR	NR	NR	NR	68	NR	46	63
Chemigation	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	6	NR	6
Banded	37	50	30	49	37	37	28	26	28	57	31	42	40
Foliar	NR	46	60	4	NR	NR	NR	NR	NR	9	NR	NR	28
Injected (knifed in)	41	56	63	36	48	40	32	23	34	120	46	44	45
Potash:													
Broadcast (ground)	106	115	76	106	74	72	22	19	26	115	30	86	90
Broadcast (air)	126	96	76	66	50	NR	NR	NR	NR	90	NR	60	96
Chemigation	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	6	NR	6
Banded	30	40	33	39	42	23	10	11	10	45	14	50	38
Foliar	NR	101	60	2	NR	NR	NR	NR	NR	4	NR	NT	55
Injected (knifed in)	80	82	73	56	52	56	17	7	17	120	NR	22	54

continued

Table 8--Commercial fertilizer application rates by how applied, major crops and producing States, 1994--continued

Crop	Cotton							Durum	Spring wheat				
	AZ	AR	CA	LA	MS	TX	AREA	ND	MN	MT	ND	SD	AREA
	Pounds per treated acre												
Nitrogen:													
Broadcast (ground)	40	104	143	79	49	46	64	38	66	56	60	60	61
Broadcast (air)	18	28	30	172	64	27	77	NR	150	25	26	100	54
Chemigation	169	92	74	NR	NR	165	121	NR	82	NR	89	NR	87
Banded	213	103	116	137	92	54	90	17	23	23	21	20	22
Foliar	1	96	10	NR	42	NR	29	NR	NR	NR	NR	NR	NR
Injected (knifed in)	156	56	138	113	105	66	96	69	85	42	72	51	70
Phosphate:													
Broadcast (ground)	37	43	92	49	55	40	44	26	43	30	47	26	42
Broadcast (air)	24	60	NR	35	53	40	42	NR	NR	20	32	NR	28
Chemigation	27	23	55	NR	NR	10	36	NR	NR	NR	NR	NR	NR
Banded	71	NR	33	36	41	33	36	26	34	21	33	20	30
Foliar	1	NR	8	NR	7	NR	7	NR	NR	NR	NR	NR	NR
Injected (knifed in)	54	28	48	40	31	28	35	26	NR	20	36	22	25
Potash:													
Broadcast (ground)	1	72	57	65	107	22	64	10	32	30	34	17	31
Broadcast (air)	1	120	7	50	60	NR	49	NR	NR	10	16	NR	14
Chemigation	12	23	51	NR	NR	10	34	NR	NR	NR	NR	NR	NR
Banded	20	71	11	59	64	22	30	9	22	7	9	9	13
Foliar	1	NR	8	NR	7	NR	7	NR	NR	NR	NR	NR	NR
Injected (knifed in)	4	43	34	38	53	14	26						

All wheat	CO	ID	IL	KS	MN	MO	MT	NE	ND	OH	OK	OR	SD	TX	WA	AREA
	Pounds per treated acre															
Nitrogen:																
Broadcast (ground)	33	85	96	53	66	82	60	40	58	80	46	86	58	68	80	59
Broadcast (air)	NR	31	53	NR	150	108	34	21	26	74	23	51	64	65	41	51
Chemigation	NR	25	107	NR	82	NR	NR	NR	89	NR	NR	122	NR	64	77	82
Banded	8	33	NR	12	24	NR	20	11	20	11	22	22	18	54	46	20
Foliar	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Injected (knifed in)	43	75	122	52	85	NR	49	45	71	NR	66	42	51	89	61	62
Phosphate:																
Broadcast (ground)	23	43	80	35	43	46	28	35	46	67	41	45	25	42	49	42
Broadcast (air)	NR	3	NR	NR	NR	NR	20	10	32	NR	22	NR	5	27	NR	20
Chemigation	NR	NR	127	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	127
Banded	26	33	NR	27	34	NR	25	27	32	41	28	23	22	47	12	29
Foliar	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Injected (knifed in)	12	20	NR	30	NR	NR	22	20	33	NR	25	20	22	36	16	24
Potash:																
Broadcast (ground)	6	40	96	33	32	60	19	4	33	78	48	29	17	20	31	52
Broadcast (air)	NR	NR	60	NR	NR	NR	10	5	16	62	NR	NR	NR	NR	NR	22
Chemigation	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	9	NR	9
Banded	NR	NR	NR	40	22	NR	8	4	9	44	13	21	16	NR	NR	14
Foliar	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Injected (knifed in)	5	NR	NR	NR	NR	NR	8	NR	83	NR	1	30	NR	20	10	25

Fall potatoes	CO	ID	ME	MI	MN	NY	ND	OR	PA	WA	WI	AREA
	Pounds per treated acre											
Nitrogen:												
Broadcast (ground)	326	138	107	175	80	78	104	108	64	176	169	142
Broadcast (air)	NR	99	NR	31	82	NR	45	6	NR	56	102	79
Chemigation	244	144	NR	107	35	NR	132	474	NR	262	77	192
Banded	535	60	160	79	53	136	66	76	141	72	111	132
Foliar	3	15	59	4	NR	NR	NR	NR	8	NR	2	21
Injected (knifed in)	NR	75	NR	174	82	NR	80	110	6	84	220	96
Phosphate:												
Broadcast (ground)	157	140	160	63	94	107	72	130	64	183	60	136
Broadcast (air)	NR	85	NR	@	NR	NR	39	17	NR	115	55	84
Chemigation	283	89	NR	60	NR	NR	52	170	NR	198	22	131
Banded	569	92	171	115	56	230	60	118	116	124	139	158
Foliar	15	13	2	NR	NR	NR	NR	NR	6	NR	2	9
Injected (knifed in)	110	98	NR	NR	NR	NR	60	67	12	102	14	87
Potash:												
Broadcast (ground)	75	107	156	241	148	183	99	159	174	230	270	154
Broadcast (air)	NR	51	NR	62	NR	NR	18	26	NR	47	23	47
Chemigation	44	77	NR	30	NR	NR	NR	231	NR	155	48	106
Banded	417	91	172	108	52	157	69	77	127	131	117	141
Foliar	NR	20	2	NR	NR	NR	NR	NR	3	NR	7	7
Injected (knifed in)	NR	67	NR	NR	NR	NR	NR	50	6	25	19	44

@ = Less than 0.5 pounds. NR = None reported. (N) = non irrigated. (I) = irrigated.
Source: Cropping Practices Survey, USDA.

Table 9--Tissue testing for nutrient needs by major crops and producing States

Soybeans	AR	IL	IN	IA	MN	MO	NE	OH	AREA
	Percent of planted acres								
Tissue tested	2	1	1	NR	@	1	NR	1	1
Tested for N 1/	80	50	100	NR	NR	100	NR	100	74
Applied recommended N 2/	100	50	100	NR	NR	100	NR	33	74
Applied > recommended 2/	NR	NR	NR	NR	NR	NR	NR	67	15
Applied < recommended 2/	NR	50	NR	NR	NR	NR	NR	NR	11

Corn	IL	IN	IA	MI	MN	MO	NE	NE(N)	NE(I)	OH	SD	WI	AREA
Tissue tested	2	3	1	2	1	1	1	1	2	2	NR	2	1
Tested for N 1/	82	100	50	100	80	100	100	100	100	63	NR	86	85
Applied recommended N 2/	67	93	67	100	100	100	48	NR	67	100	NR	83	80
Applied > recommended 2/	NR	7	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	2
Applied < recommended 2/	33	NR	33	NR	NR	NR	52	100	33	NR	NR	17	18

Cotton	AZ	AR	CA	LA	MS	TX	AREA
Tissue tested	24	15	33	22	21	1	11
Tested for N 1/	94	100	100	100	94	55	96
Applied recommended N 2/	100	100	95	100	97	100	98
Applied > recommended 2/	NR	NR	NR	NR	NR	NR	NR
Applied < recommended 2/	NR	NR	5	NR	3	NR	2

Fall potatoes	CO	ID	ME	MI	MN	NY	ND	OR	PA	WA	WI	AREA
Tissue tested	53	84	3	64	23	2	44	76	9	87	45	61
Tested for N 1/	100	99	80	89	90	50	91	100	28	100	100	98
Applied recommended N 2/	100	72	100	65	96	100	98	89	100	92	95	82
Applied > recommended 2/	NR	4	NR	21	NR	NR	NR	7	NR	1	5	4
Applied < recommended 2/	NR	23	NR	14	4	NR	2	4	NR	7	NR	14

@ = less than 0.5 percent. NR = None reported. (N) = non irrigated. (I) = irrigated.

1/ Percent of tissue tested acres tested for nitrogen. 2/ Percent of nitrogen tissue tested acres.
Source: Cropping Practices Survey, USDA.

Cropping Practices Survey

The Cropping Practices Surveys collect annual data on fertilizer and pesticide use, tillage systems, crop sequence, and information on other inputs and cultural practices. Fertilizer information has been reported from these surveys since 1964. In the mid-1980's, pesticide use, tillage operations, and prior crop questions were added to the survey. Integrated pest management and nutrient management questions have recently been included.

The 1994 surveys included corn, cotton, soybeans, wheat, and potatoes and represented about 172 million acres. This area includes the acreage in major producing States, which account for about 76 percent of the total U.S. acreage for these crops. Because of priority data needs and available survey funds, the number of crops and States have varied from year to year. The following crops and States have been included in the 1994 surveys of fertilizer use:

Corn:	IL, IN, IA, MI, MN, MO, NE, OH, SD, and WI
Soybeans:	AR, IL, IN, IA, MN, MO, NE, and OH
Cotton:	AR, AK, CA, LA, MS, and TX
Winter wheat:	CO, ID, IL, KS, MO, MT, NE, OH, OK, OR, SD, TX, and WA
Spring wheat:	MN, MT, ND, and SD
Durum wheat:	ND
Fall potatoes:	CO, ID, ME, MI, MN, NY, ND, OR, PA, WA, and WI

The sample consists of fields containing a random acre selected through a stratified sampling procedure. Respondents are asked to provide field-level information for the fields containing the sample acre. The operator of the selected sample field is asked to report all fertilizer and nutrient treatments, all tillage operations prior to planting, crops planted in the previous 2 years, and data on other inputs and cultural practices.

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